DETAILED ACTION

Request for Continued Examination (RCE) Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 01/21/2011 has been entered.

Response to Arguments

2. This office action is in response to the amendment filed on 01/21/2011. Claims 1, 4, 6, and 8-12 are pending in this application and have been considered below. Claims 2-3, and 5 are withdrawn from consideration and claim 7 is cancelled by the applicant.

3. Applicant's arguments with respect to claims 1 have been considered but are moot in view of new ground(s) of rejection because of the amendments.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1, 4, 6, and 8-12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The new limitation added by the amendment filed on 01/21/2011 in the independent claims 1 and 4 and dependent claims 6, 8-9, and 11 **"a symbol frequency"** is not supported by the applicant's original disclosure. The examiner is unable to find any clear support for the above newly added limitation in the applicant's original disclosure. Moreover, none of the originally filed drawings show the above newly added limitation.

To clarify the above issue, the examiner conducted a telephone interview with applicant's representative David Ward on February 16, 2011 regarding the above newly added limitation in the independent claims 1 and 4 and dependent claims 6, 8-9, and 11.

To show support for the newly added limitations **"a symbol frequency"**, the applicant's representative discussed few paragraphs of the original specification of the instant application. The examiner was unable to find any clear/explicit support for the above newly added limitations anywhere in the original disclosure of the application. However, the original disclosure does describe "The modulators 110 and 120 are

configured to have respective carrier frequencies with **a difference by a frequency corresponding to the reciprocal of the symbol rate** (i.e. fundamental frequency of the input symbol)" (see abstract). But, nowhere in the original disclosure is "a symbol frequency" described. Hence, the newly added limitation **"a symbol frequency"** lacks "written description requirement" in the original disclosure of the application.

Therefore, the newly added limitation in independent claims 1 and 4 and dependent claims 6, 8-9, and 11 raises an issue of "new matter" as the limitation is not supported by the applicant's original disclosure.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1, 4, 6, and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Daoud et al. (US 4835791) (disclosed in the IDS filed on 01/23/2006) (hereinafter Daoud) in view of Muzzi et al. (US 3628155) (hereinafter Muzzi).

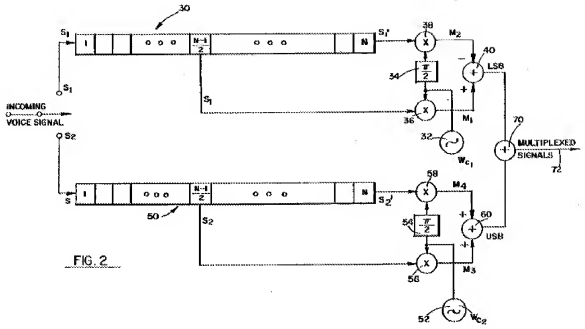

FIG. 2

Regarding claims 1 and 4:

As shown in figures 1-3, Daoud disclose a modulation apparatus comprising:

- a first frequency-increasing single side band (SSB) modulator **(50 in figure 2)** that performs SSB modulation on a first input symbol **(S2 in figure 2)** to obtain an upper side band (USB) signal **(USB in figure 2) (col 2, lines 29-47)**;
- a second frequency-increasing SSB modulator **(30 in figure 2)** that performs the SSB modulation on a second input symbol **(S1 in figure 2)** to obtain a lower side band (LSB) signal **(LSB in figure 2) (col 2, lines 29-47)**; and
- a combiner **(70 in figure 2)** that combines the USB **(USB in figure 2)** signal and the LSB signal **(LSB in figure 2) (col 2, lines 29-47)**,
- wherein the second frequency-increasing SSB modulator performs SSB modulation to obtain the LSB signal using a carrier frequency, the carrier frequency being higher than a carrier frequency used in the first frequency-increasing SSB modulator by a

symbol frequency of the input symbol **(200 Hz frequency gap interpreted to be a symbol frequency. See col 4, lines 38-49)** and the second input symbol **(col 4, lines 38-49)**.

Although, Daoud teaches that "Preferably the frequency of the second carrier siqnal wc2 used in the upper sideband generator is slightly higher than the frequency of the first carrier signal wc1 used in the lower sideband generator, so there is a frequency gap between the lower sideband siqnal and the upper sideband signal (see col 4, lines 38-49), it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the system of Daoud to switch the carrier frequencies (Wc1 and Wc2) of Daoud and applying Wc2 to the LSB modulation and Wc1 to the USB modulation in order to yield predictable results ***(see KSR – some teaching, suggestion, or motivation in the prior art that would have led one of ordinary skill to modify the prior art reference or to combine prior art teaching to arrive at the claimed invention")***.

Daoud discloses all of the subject matter as described above including a multiplexing summer **(70 in figure 1)** which produces multiplexed signals **(see the output of the summer 70 in figure 1)** except for specifically teaching such that the LSB signal and the USB signal are multiplexed in the same frequency band.

However, Muzzi in the same field of endeavor teaches such that the LSB signal and the USB signal are multiplexed in the same frequency band **(figure 4, 17 in figure 8, col 2, lines 16-28)**.

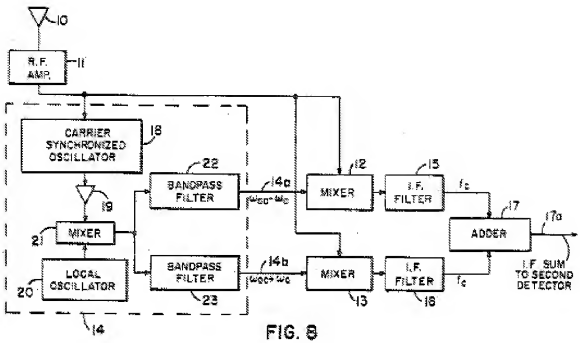

FIG. 8

Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to substitute the summer as taught by Muzzi to for the summer of Daoud in order to obtain predictable results **(KSR – simple substitution of one known element for another to obtain predictable results)**.

Regarding claims 6 and 8:

Daoud further disclose demodulation apparatus **(see figure 3)** for demodulating a signal combined by the combiner **(70 figure 2)** in the modulation apparatus **(see figure 2)** according to claim 1, the demodulation apparatus comprising:

- a first frequency-decreasing demodulator **(82, 86, and 90 in figure 3)** that demodulates an input modulation signal by a cosine curve with a first carrier frequency **(W_{c1} in figure 3)** to obtain a first demodulation signal **(see the first**

demodulation signal provided by first demodulator in figure 3) (col 4, lines 38-49, col 5, lines 43); and

- a second frequency-decreasing demodulator **(84, 88, and 92 in figure 3)** that demodulates the input modulation signal by a sine curve with a second carrier frequency **(W_{c2} in figure 3)** to obtain a second demodulation signal **(see the output of 84, 88, and 92 in figure 3)**, wherein
- the second carrier frequency **(W_{c2} in figure 3)** is higher than the first carrier frequency **(W_{c1} in figure 3)** by the fundamental frequency of the first input symbol **(S2 in figure 2)** and the second input symbol **(S1 in figure 2) (see the second demodulation signal provided by second demodulator in figure 3) (col 4, lines 38-49, col 5, lines 43)**.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KABIR A. TIMORY whose telephone number is (571) 270-1674. The examiner can normally be reached on 8:00 AM - 4:30 PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kabir A Timory/
Examiner, Art Unit 2611